



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,169	12/05/2005	Marc Husemann	101769-318-WCG	1177
27386 7590 03/23/2009 NORRIS, MCLAUGHLIN & MARCUS, P.A. 875 THIRD AVE 18TH FLOOR NEW YORK, NY 10022				
EXAMINER ZHAO, XIAO SI				
ART UNIT 1792		PAPER NUMBER		
MAIL DATE 03/23/2009		DELIVERY MODE PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/540,169

Applicant(s)

HUSEMANN ET AL.

Examiner

XIAO ZHAO

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/12/2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)
Paper No(s)/Mail Date 7/5/2005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. After reconsideration, the restriction requirement made over the telephone is withdrawn. Claims 1-20 are examined on the merits.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. **Claims 1-12, 14 -20 are rejected under 35 U.S.C. 103(a) as being unpatentable by Husemann et al. (US 2003/0114582) in view of Bunyan (US 2002/0012762).**

Per independent claim 1:

Husemann et al. teach a method of producing a pressure sensitive adhesive (PSA) that is anisotropic ([0114]) in which stretching is used to create the orientation of

the tape after it is coated onto a backing material ([0101]). The PSA is coated as a layer onto the backing material ([0102]). The tape displays a shrinkback of at least 3% (Table 1).

Husemann et al. does not teach that the PSA is a thermally conductive PSA.

Bunyan teaches a double-sided thermally conductive PSA (see abstract) that utilize thermally conductive fillers with PSA (claim 36).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include thermally conductive materials, as taught by Bunyan, into the PSA taught by Husemann et al. One would have been motivated to do so because thermally conductive PSA are known in the art, as shown by Bunyan, and by adding thermal conductive materials into the PSA of Husemann et al. will expand the industrial applicability of the PSA so it can be used to successfully transfer heat in electronic devices. This is because by adding thermal conductive materials into the PSA, the heat transfer efficiency of the tape will be increased (see Bunyan, [0008]).

Per claims 2-3, Husemann et al. teach that a melt die or an extrusion die is used as the coating process in which stretching is used ([0101]).

Per claim 4, Husemann et al. teach that the PSA can be coated onto one or both sides of a carrier ([0114]).

Per claim 5, Husemann et al. teach that the carrier can be a transfer tape (claim 20).

Per claims 6-7, Husemann et al. teach the composition and structure ([0029] and [0030]).

Per claim 8, Husemann et al. teach that crosslinkers are used ([0040]).

Per claim 9, Husemann et al. teach that PSA can be crosslinked with electron beams ([0108]) while the reference didn't specify that it is done immediately after or during hotmelt coating, it would have been obvious to a skilled artisan that crosslinking the PSA should be done before the adhesive is fully set (which means either during the process or immediately after).

Per claim 10, see claim 1.

Per claim 11, Buyan teaches that the thermally conductive filler can be added between 20-80% by weight ([0056]).

Per claim 12, Buyan teaches that the PSA with the thermally conductive filler exhibit a conductivity of 0.1 W/mK to 1 W/mK ([0052]).

Per claim 18, Buyan teaches that the thermal conductive material is aluminum nitride (claim 36).

Per claim 19, Buyan teaches that the filler can be powder form ([0056]).

Per claim 20, Buyan gives a non-limiting example in which 50% of thermal conductive filler is used ([0064]).

Per claims 11-12 and 18-20, it has been established that it would have been obvious to use Buyan's thermally conductive filler with Husemann et al.'s PSA. Thus, it

would also be obvious to use the characteristics of the thermally conductive filler and arrive at predictable results.

Per claim 14, Husemann et al. teach that aging inhibitors can be added (claim 12).

Per claim 17, Husemann et al. teach that the crosslinker can be a polyfunctional isocyanate ([0097]).

Per claim 15, Buyan teaches a PSA article that is used for bonding two electrical parts (abstract).

Per claim 16, Buyan teaches that the PSA article can be for die-cutting ([0058]).

Per claims 15-16, it has been established that it would have been obvious to combine Buyan and Husemann et al. to arrive at a thermally conductive PSA. A skilled artisan would've used the thermally conductive PSA to join two electrical parts since thermally conductive PSA will help with heat dissipation and transfer. Furthermore, one will want to diecut the PSA adhesive in order to achieve a desired shape to better fit the tape into electrical parts.

5. Claims 13 is rejected under 35 U.S.C. 103(a) as being unpatentable by Husemann et al. (US 2003/0114582) in view of Bunyan (US 2002/0012762) as evidenced by DeGree et al. (US 4,810,563).

Husemann/Bunyan teach all the limitations of claim 1 but fail to teach that the thermal conductive materials are anisotropic and is lower along a plane lying in the PSA layer than transverse (or cross) to the plane of the layer, it being at least 0.06 W/mK in a direction transverse to the plane of the layer.

DeGree et al. teach that blend of alumina and boron nitride is found to possess anisotropic thermal conductive properties (col. 6, 10-13).

Since Bunyan teaches that the thermal conductive fillers can be alumina and boron nitride, it is inherent that Bunyan's thermal conductivity is anisotropic.

Husemann/Bunyan, as evidenced by DeGree, does not specify that the thermal conductivity is lower along a plane lying in the PSA layer than transverse to the plane of the layer, it being at least 0.6 W/mK in a direction transverse to the plane of the layer.

However, since Husemann/Bunyan, as evidenced by DeGree, produces a anisotropic thermal conductive PSA, using the same steps and materials as instantly claimed, it would be inherent that it is also has a lower thermal conductivity that is lower along a plane lying in the pressure-sensitive adhesive layer than transverse to the plane of the layer. The thermal conductivity of at least 0.06 W/mK is determined by how much weight % of thermal conductive fillers used. It would have been obvious to a skilled artisan to manipulate and optimize the amount of fillers used to arrive at a desirable thermal conductivity.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to XIAO ZHAO whose telephone number is (571)270-5343. The examiner can normally be reached on Monday to Friday 8:30 am EST to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on (571)272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Xiao S Zhao/
Examiner, Art Unit 1792
/Michael Kornakov/
Supervisory Patent Examiner, Art Unit 1792

